PHOS and CPV calibrations

D.Peresunko
NIC Kurchatov Institute

- PHOS
  - Amplitude calibrations
  - Time calibrations
  - Bad Map
- CPV
  - Pedestal
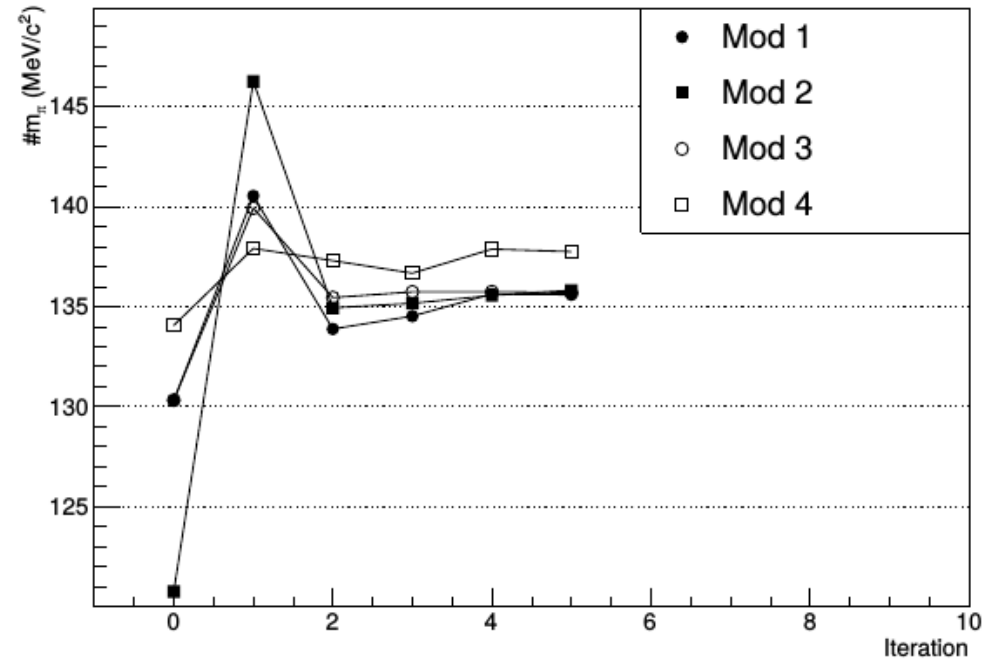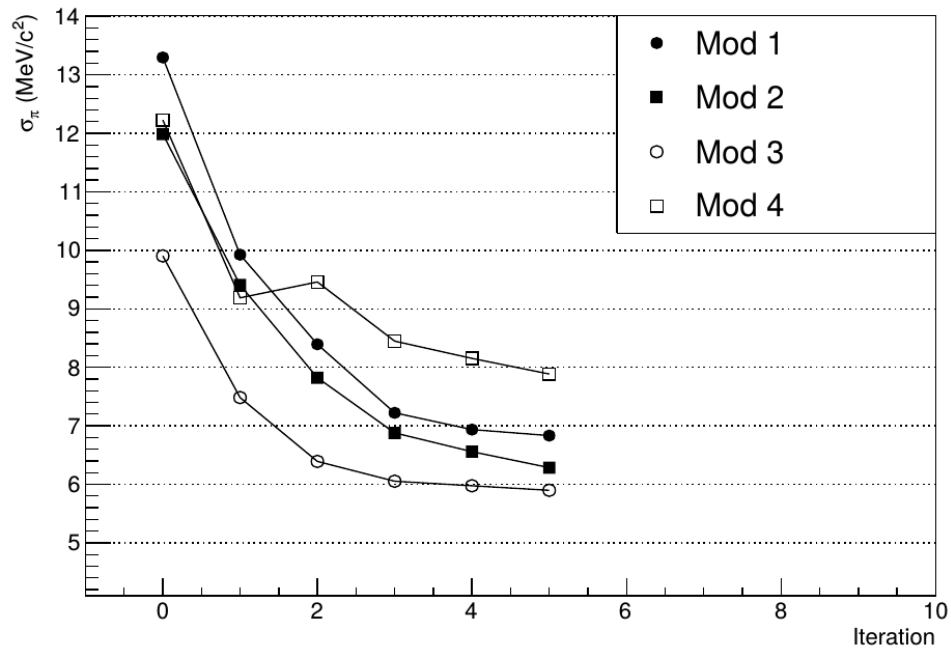 - Gain calibrations
  - Bad Map

PHOS amplitude calibration

- Low Gain vs High Gain calibration

  - **How**: Use LED run with medium amplitude, manual

  - **Frequency**: Once per change of APD bias settings. Normally, once per Run (2015-2017)

  - **Where stored**: OCDB

  - **Status:** Done

- High Gain calibration

  - **How**: APD gains, slopes, π^0 peak positions. Manual, using reconstructed triggered data

  - **Frequency**: ~ once per year, or once per APD bias settings

  - **Where stored**: OCDB, improvements in OADB

  - **Status**: First version done, Improved is cross-checked

Gain calibration in PHOS and CPV

1) Collect large amount of physics data with pp collisions.
    Required statistics: few hundred π^0 per cell

2) Run quick muon_calo reconstruction to get ESD/AOD with PHOS objects
    AliESDCaloClusters, AliESDCaloCells

3) Run iterative procedure for energy calibration (~5 iterations).
    Coded as analysis task AliAnalysisTaskPi0Calib

4) As a result of calibration in analysis task, corrections to original calibration
    parameters are created O(1)

5) Final calibration parameters are the product of original calibration by the found
    corrections

6) Result is stored in OCDB for further processing in full reco (pass1, pass2 etc)

7) PHOS/CPV does not participate in cpass campaign

Example of PHOS calibration using p^0 peak

PHOS time calibration

- Low Gain vs High Gain
  - **How**: LED runs with medium amplitude
  - **Frequency**: once per change APD settings variation
  - **Where stored**: OCDB
  - **Status**: being performed; presently use inherited from Run1
- High Gain timing
  - **How**: Use physics runs
  - **Frequency**: once per change APD settings variation
  - **Where stored**: OCDB, improvements – in OADB
  - **Status**: being performed; presently use default
- L1phase shift
  - **How**: offline analysis, manual? Wagon to QA train?
  - **Frequency**: per run
  - **Where stored**: OADB
  - **Status**: Debugging code

PHOS BadMap

Minimal bad map is composed from channels excluded from readout and obviously noisy channels

Presently in OCDB

Frequency: normally once per period or even rarer.

Detailed bad map (may depend on analysis) applied by Tender and stored in OADB.

Not constructed yet. Analysis is ongoing.

CPV calibration

CPV has 3 OCDB objects: pedestals, gains, bad channel map.

CPV pedestals: calculated in a dedicated PEDESTAL run taken before each fill. Pedestal histograms are filled by CPV DA and stored in OCDB by shuttle.

Run validity: from the current pedestal run to infinity.

CPV gains: calculated in physics runs. CPV DA accumulates histograms with energy spectra per cell, then preprocessor fits the spectra by Landau function if statistics is large enough. If statistics per channel is low, accumulation continues in the next runs.

Frequency of updates: either in each run or when statistics reaches a nominal value.

CPV bad channel map: calculated in physics runs by CPV DA.

Frequency of updates: The same criteria of updates, as for CPV gains.